

AD-761 388

AN ALTERNATIVE METHOD FOR THE EMPLOY-
MENT OF THE SHOULD COST CONCEPT

Bartlett Lee Clark

Naval Postgraduate School
Monterey, California

March 1973

DISTRIBUTED BY:

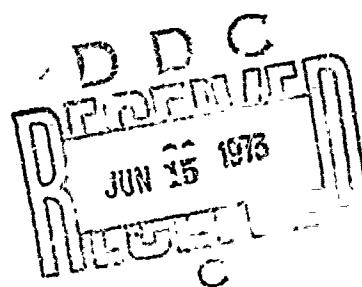


National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

AD 761388

NAVAL POSTGRADUATE SCHOOL

Monterey, California



THESIS

An Alternative Method for the Employment
of the Should Cost Concept

by

Bartlett Lee Clark

Thesis Advisor:

D. C. Burns

March 1973

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. Department of Commerce
Springfield VA 22131

Approved for public release; distribution unlimited.

72

Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1c. ORIGINATING ACTIVITY (Corporate author) Naval Postgraduate School Monterey, California 93940		2a. REPORT SECURITY CLASSIFICATION Unclassified
		2b. GROUP
3. REPORT TITLE An Alternative Method for the Employment of the Should Cost Concept		
4. DESCRIPTIVE NOTES (Type of report and, inclusive dates) Master's Thesis, March 1973		
5. AUTHOR(S) (First name, middle initial, last name) Bartlett L. Clark		
6. REPORT DATE March 1973	7a. TOTAL NO. OF PAGES 69	7b. NO. OF REFS 27
8b. CONTRACT OR GRANT NO.	9b. ORIGINATOR'S REPORT NUMBER(S)	
6. PROJECT NO. e. d.	9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	

10. DISTRIBUTION STATEMENT

Approved for public release; distribution unlimited.

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY Naval Postgraduate School Monterey, California 93940
-------------------------	---

13. ABSTRACT

The procurement costs of military hardware have risen dramatically in recent years. Presently, there is a great deal of pressure exerted on military officials to control the rising procurement costs. One of the more promising techniques being used toward this end is known as "Should Cost Analysis." Should-cost is a cost analysis technique that provides the government with an independent cost estimate for production contracts.

Currently, the Army, the Navy, the Air Force, and the General Accounting Office (GAO) all conduct independent should cost analyses whenever they deem it appropriate to do so. This paper proposes that, as an alternative to the present employment of the should cost concept, all future should cost studies be controlled and conducted by the GAO alone. The author of this paper feels that, if adopted, this alternative would result in the more cost-effective application of the should cost concept.

Security Classification

145 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Should Cost						
General Accounting Office						
Cost Analyses						
Military Procurement						

WT

An Alternative Method for the Employment
of the Should Cost Concept

by

Bartlett Lee Clark
Lieutenant, United States Navy
B. S., United States Naval Academy, 1967

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

FROM THE

NAVAL POSTGRADUATE SCHOOL
March 1973

Author Bartlett Lee Clark

Approved by C. C. B. 3/26/73 Thesis Advisor

P. R. J. Second Reader

Jack R. Bentley Chairman, Department of
Operations Research and Administrative Sciences

Milton M. Kammer Academic Dean

ABSTRACT

The procurement costs of military hardware have risen dramatically in recent years. Presently, there is a great deal of pressure exerted on military officials to control the rising procurement costs. One of the more promising techniques being used toward this end is known as "Should Cost Analysis." Should cost is a cost analysis technique that provides the government with an independent cost estimate for production contracts.

Currently, the Army, the Navy, the Air Force, and the General Accounting Office (GAO) all conduct independent should cost analyses whenever they deem it appropriate to do so. This paper proposes that, as an alternative to the present employment of the should cost concept, all future should cost studies be controlled and conducted by the GAO alone. The author of this paper feels that, if adopted, this alternative would result in the more cost-effective application of the should cost concept.

EXECUTIVE SUMMARY

BACKGROUND

Rapidly rising procurement costs of modern weapons systems have resulted in increasing pressure for the efficient utilization of defense dollars. Today's weapons are far more complex, sophisticated, and expensive than were their predecessors. While the cost of weapons systems has increased, the actual buying power of the military has been declining in recent years.

Page 6

The high cost of production of modern weapons has decreased the number of contractors able to compete for contracts. In many large dollar value procurements, there is no effective competition at all. In these cases, the normal procurement methods (which rely on free competition) are inadequate to protect the best interests of the Government. It is for these cases that should cost has proven particularly valuable.

Page 7

SHOULD COST

Should cost is a concept which provides the Government with an alternative to the production contract proposal submitted by a sole-source supplier. A should cost analysis is a very thorough industrial efficiency study performed on a defense contractor by a team of government specialists in various industrial fields.

Page 16

Should cost studies are performed in order to obtain better contract terms than would have been attained using normal procurement methods. An equally important goal is improvement in the operating efficiency of defense contractors. Should Cost re-directs management's attention towards areas of operation that have become inefficient.

Page 17

Should cost studies will not be conducted unless the expected benefits from such studies will exceed costs. The Government must have an adequate amount of money, time, and manpower available before a should cost study can be undertaken. Certain conditions concerning the specific contracting situation must be met before a study will be done.

Page 19

Each should cost analysis is unique, because the conditions leading up to each study are different. There is, however, a general similarity in form among all studies. First, the magnitude and scope of the study is decided upon. Second, an advance team inspects the contractor's plant. Third, the full team arrives at the plant and conducts the should cost study. Fourth, the data from the study is analyzed. When all this has been done, the Government proceeds with contract negotiations.

Page 22

At Present, the Army, Navy, Air Force, and GAO all conduct should cost analyses when they deem it necessary to do so. Each of these agencies has distinctive requirements to satisfy so each agency's version of should cost is slightly different from the other.

Page 26

PROBLEMS WITH SHOULD COST

A should cost analysis represents a tremendous drain on valuable government agency resources. A should cost study is expensive to perform. It is difficult to supply manpower with the necessary talent without placing an excessive burden on the agencies supplying the personnel. It is difficult (and expensive) to train new personnel in the intricacies of should cost.

Page 32

Problems often arise with the contractor who is to receive the study. A should cost study can severely disrupt a contractor's operation. The contractor may not want to extend the findings of a study to all his other government contracts. He may not want to permit his management's valuable time to be spent answering should cost team questions. The contractor may have serious doubts about the competence of the should cost team members.

Page 35

Current military should cost teams are not totally independent of the contractor. Both the military and the contractor have an interest in producing the weapon in question as quickly as possible. Military should cost teams are not always objectively critical of military procurement practices and agencies.

Page 39

RECOMMENDED IMPROVEMENTS

All should cost authority should be concentrated in one single agency. That agency should create a permanent should cost staff having a professional attitude toward should cost. The emphasis of future studies should be more fully directed toward broad, long term improvements in contractor efficiency. The agency selected for sole should cost responsibility ought to be independent of both the military and the contractors. It should be fully capable of conducting many studies.

Page 41

THE GAO AS THE SHOULD COST AGENCY

In this writer's opinion, the GAO should be the agency selected to conduct all future should cost studies. In recent years the functions of the GAO have been expanded to include many areas of management study. The GAO's primary duty remains as the monitor of Federal expenditures, but its methods now include much more than accounting. Should cost is compatible with the GAO's function of monitoring expenditures of federal agencies. The GAO has an excellent vantage point from which to view the impact of should cost studies. It is an independent and influential agency. Teamwork, which is important for successful should cost studies, is a characteristic of GAO audit teams.

Page 48

The GAO should be granted additional legal authority in order to conduct should cost studies. It should create a permanent should cost staff to conduct or coordinate all should cost studies. Special attention should be paid by the GAO to the composition and dissemination of detailed reports on its should cost studies.

Page 53

It would be necessary for the Congress and the military, as well as the GAO, to have a formal method for recommending that a should cost study be performed on specific contractors. The final decision on whether or not to conduct any given study would rest with the GAO. The actual mechanics of a GAO should cost study would be the same as they are at present. After the GAO had completed its study, the military agencies would conduct the contract negotiations making whatever use they saw fit of the GAO study results.

Page 55

POTENTIAL BENEFITS

The GAO would be better able to carry out its present duties relating to the monitoring of defense procurement agencies. It would have a better understanding of where defense money goes and of the actual problems facing the defense industry. The GAO would be able to make more valid recommendations to the Congress on defense procurement matters.

Page 60

The military would be freed of the necessity of staffing should cost studies with its talented procurement people. It would save the money and manhours that go into supporting such efforts. The military would also benefit indirectly from the increased understanding that GAO would acquire of defense procurement difficulties.

Page 61

The nation as a whole would benefit from the resulting improvements of utilization of tax dollars for defense. The reports by the GAO to Congress would enlighten the Congress on the subject of defense procurement. A well-informed Congress would make decisions on policy that are better for the nations well being.

Page 63

I. INTRODUCTION

Military planners are currently finding themselves under an ever increasing pressure to control the rising cost of modern day weapons systems. A number of cost control techniques have been employed in an attempt to obtain, at a reasonable price, the weapons necessary for national defense. One of the more promising of these techniques is called "Should Cost Analysis" (or should cos:). Should cost is a method of contract pricing which provides the government negotiators with a firmer bargaining position during contract negotiations. When properly employed, the should cost concept can promote long term improvements in the efficiency of major defense contractors. While should cost has demonstrated exciting potential, it is not without draw-backs. This thesis is based on research done on should cost. This writer later proposes an alternative method of utilizing the should cost analysis concept. Many of the problems (later described) which occur with present should cost techniques would be reduced or avoided by using the proposed alternative.

A. BACKGROUND

One need only look at today's weapons systems to understand why the cost of military procurement has risen so dramatically. In order to maintain a safe degree of military superiority over potential enemies, it is necessary to produce and deploy weapons with a high degree of technological advancement. Weapons must possess capabilities and accuracies never before required (e.g. aircraft must be maneuverable and yet carry a heavy weapon load, missiles must travel great distances and impact on precisely the correct spot). To meet

these demanding requirements, extensive expenditures of the nation's valuable resources must be made to both advance the technological state-of-the-art and to complete the production of weapons subsequently developed. Today's weapons systems are much more sophisticated and complex than any of their predecessors. This complexity adds to the degree of difficulty in producing and maintaining these systems. Finally, the rate at which our weapons systems become obsolete has never been as great. All of these factors combine to make the price of military preparedness higher than at any time in our history.

While the price of weapons systems continues to increase, military planners are encountering more and more difficulty in obtaining needed funds. If one adjusts the dollar for inflation, it can be seen that the military procurement budget (i.e. real buying power) has actually decreased in recent years.¹ The emphasis of government spending has shifted away from defense and is now focused on correcting long neglected social ills.² The long, grueling war in Southeast Asia has fostered among many civilians a general unpopularity of the military. There is a strong popular sentiment to curtail the power of the military establishment. This sentiment is reflected in Congress

¹In 1970 expenditures for defense totaled \$80,295,000,000 or 40.8 percent of the federal budget. In 1972 defense expenditures totaled \$77,512,000,000 or 33.8 percent of the budget. See pages 29 and 30 of Reference A. (Note: These sums are expressed in 1970 and 1972 respectively.

²According to an article in the U. S. News and World Report, Vol. LXXIV, No. 6, February 5, 1973, the amount spent on defense will rise from \$78.3 billion in fiscal 1972 to \$81.1 billion in fiscal 1974. During that same period, the amount spent on various socially oriented programs will rise from 103.0 billion to 131.8 billion.

and has resulted in closer scrutiny of military budget requests. Thus, the military is faced with the dilemma of having to obtain weapons systems that are growing more and more expensive on a budget that is growing smaller and smaller.

B. MILITARY PROCUREMENT

The Congress of the United States has empowered the President, as Commander in Chief of the Armed Forces, to establish agencies to expend the monies appropriated by Congress for the maintenance of the Armed Forces. The Secretary of each of the Armed Forces, acting for the President, have established the methods by which the money is actually spent. In order to make military fiscal policies more responsible and economical, the Congress enacted (in 1947) the Armed Services Procurement Act. Included in this act were the Armed Services Procurement Regulations (ASPR) [Ref.B]. The ASPR dictated the standards to which all military procurement agencies must adhere in conducting their contracting activities. It provides detailed guidance on virtually all aspects of contracting.

The purpose of ASPR is to protect the Government from consequences of faulty contracting policies and procedures. If followed to the letter, the policies specified by the ASPR will help ensure that the Government will not enter into a contract that is not in its own best interest. The ASPR relies heavily upon free and open competition to provide the Government with a fair and reasonable market price. It specifies that, if at all possible, government contracting personnel must utilize price competition in their contracting efforts.³ If

³ASPR 2-102 and 3-101 require the maximum practical competition consistent with the nature of the procurement.

competition is not feasible, then a full and careful review by high ranking officials is mandatory.

The ASPR defines four categories of procurement that may be encountered. All military procurements will fall into one of these categories.

1. Formal Advertising

Formal advertising is the simplest of the four procurement methods. It makes the greatest use of the competitive market environment, and is required by ASPR to be used if at all possible. The Naval Material Command publication Defense Procurement Management [Ref. C] discusses formal advertising in detail. Formal advertising can only be effective when a procurement satisfies the following four prerequisites:⁴

- (1) Definite specification are available.
- (2) There are two or more suppliers who can fulfill the demand.
- (3) The successful bidder can be selected on the basis of the price alone.
- (4) Sufficient time is available to allow the formalities involved to be carried out.

Due to the complexity of current military weapons, most procurements do not satisfy all of these prerequisites for the use of formal advertising. In 1971, formal advertising accounted for only 7.3 percent of all Navy procurement [Ref. D].

⁴See page 33, Ref. C.

2. Two-Step Formal Advertising

Two-step formal advertising is very similar to formal advertising, but it includes an extra step in order to obtain more competition. With formal advertising, the Government simply issues Invitations for Bids (IFB) to all qualified suppliers of the product desired. Two-step formal advertising involves both technical competition and price competition. Step one consists basically of describing the requirements to all qualified defense contractors. This is accomplished by the issuance of a Request for Technical Proposal (RTP) by the procuring agency in accordance with ASPR 2-503 (a) [Ref. B]. Any defense contractor wishing to respond will submit to the procuring agency a detailed technical proposal (but no price information). In step two, the procuring agency selects those proposals it considers feasible and conducts price competition using procedures similar to formal advertising (discussed earlier). This widens the range of acceptable proposals and, thus, results in increased competition. The two-step method can only be used where specifications are somewhat flexible. There are very few cases where two-step formal advertising is particularly useful. In 1971, the two-step methods accounted for only .7 percent of Navy procurement dollars [Ref. D].

3. Competitive Negotiation

Negotiation will be used whenever, in the opinion of the Government, its use will result in a better contract price than would the use of formal advertising or if formal advertising is not feasible and practicable. The ASPR [Ref. B] lists seventeen specific exceptions to the requirement for the use of formal advertising. All negotiated procurements must fall under one of these seventeen

exceptions. As the name implies, competitive negotiation involves the simultaneous negotiation with two or more manufacturers with the intent of selecting the best procurement package for the Government. Competitive negotiation affords the Government a great degree of flexibility in the design of the product it receives. To a great extent, the effect of open market competition is maintained. The only major draw-back to this type of procurement is that much time, money, and manpower is required to conduct the negotiations. The existence of competition relieves the Government of the necessity of conducting extensive analyses of contract prices. Competitive negotiation is easier and less expensive than is non-competitive contract negotiation. In 1971, competitive negotiation accounted for 22.3 percent of Navy procurement dollars [Ref. D].

4. Non-Competitive Negotiation

In spite of all efforts to promote competition, the nature of military needs forces the use of sole-source suppliers for many military weapons procurement. These sole source suppliers are generally used for the major weapons programs, consequently, they receive a large portion of the procurement funds. In these situations, the total lack of competition forces the Government to perform detailed analyses of the costs involved in the production of the item in question. Cost Analysis of a major defense program is an extremely involved undertaking requiring significant allocations of time, money and manpower. A negotiation conducted with a sole-source supplier almost always turns out to be more complex and expensive than would have been the case had adequate competition been available. In 1971, non-competitive negotiation accounted for 69.7 percent of all Navy

procurement dollars [Ref. D]. It is in this category of military procurement that most cost growths have occurred. To control the prices of weapons systems, military procurement agencies must find an effective way of functioning in sole-source situations.

C. PROBLEMS IN MILITARY PROCUREMENT

As modern weapons systems continue to grow more complex, the cost of acquiring these systems continues to rise. During World War II, a fighter plane could be purchased for under \$100,000. At these relatively low prices, a large number of companies were able to submit competing designs and prototypes. The Government was able to select the best design and purchase the aircraft in substantial numbers. The limiting factor for the number of aircraft obtained was not the cost, but the number of pilots available to fly them. Today the situation is different. The limiting factor is not the pilots, but the tremendous cost to the Government of purchasing and maintaining modern aircraft. The F-14 Tomcat fighter plane will have a purchase price of approximately \$16,700,000 and will have a life-cycle cost of between \$80 and \$100 million per aircraft. The Navy can afford to buy only 350 of these weapons. Even small countries such as Egypt have more than 350 MIG-21 (comparable to the F-4) aircraft. It is argued [Ref. E] that it is the number of aircraft available (rather than minor differences in the performance of each type) that is of military significance.⁵ The problem of rising costs of aircrafts has parallels in virtually every other type of modern day weapons system. The rising cost of providing adequate weapons for our armed forces

⁵See page 70, Ref. E.

is becoming a serious obstacle for our military planners. The control of the costs of weapons systems is a challenge that must be met by military procurement officials.

To keep military procurement costs within acceptable levels, the military must do two things. First, decisions must be made as to the true worth of the sophistication being built into today's weapons (e.g. An F-14 cost about five times as much as an F-4. Is an F-14 really worth five Phantom Jets?). Second, military procurement agencies must see to it that the armed forces get a dollar's worth of value for each dollar spent.

An unfortunate side effect of the staggering costs of modern weapons systems is that the large initial capital outlays necessary for production have severely reduced the number of companies that are able to enter the competition. Today, there are only a handful of aircraft companies, shipbuilders, arms manufacturers, etc. that have sufficient financial resources to allow them to compete for government contracts. Even among these, many require some form of financial support from the Government.

The net effect of limited competition among defense suppliers is that operating inefficiencies tend to persist much longer than they do in a truly competitive environment. All too often one hears stories of contractors placing bids based on honest but optimistic cost estimates only to discover, after the contract has been awarded, that the true costs are much higher. Regardless of the type of contract used, the Government usually winds up paying the increased costs. If a cost-reimbursable type of contract is used, the added cost is passed on to the Government automatically. If a fixed price type of contract

is used, the cost increase is passed on to the Government in the form of:

- (1) claims by the contractor against the Government,
- (2) greatly increased prices for follow-on purchases, or
- (3) outright requests for financial relief for the contractor.

While a portion of these cost increases are undoubtedly caused by unforeseen developments, it is likely that a significant amount of them are the result of inefficient and uneconomical operating practices.

If the nation is to derive the optimum benefit from its defense dollars, some means must be employed to determine what constitutes a fair and reasonable price for a given weapons system. A good price is one that provides an adequate profit to the defense contractor to keep him in business, yet does not pay for his wasteful and unnecessary business practices. Current military procurement policies rely heavily upon the effects of free, open market competition to assure efficient, economical contractor operation. As the number of defense contractors shrinks, the forces of open competition become more ineffective. Under the current conditions, the best price obtainable by normal military procurement methods is not always a fair and reasonable price.

To determine what constitutes a fair and reasonable contract price, military procurement agencies must be able to do four basic things:

- (1) Determine what it ought to cost to fulfill the obligations of the contract if the operations were reasonably efficient.
- (2) Evaluate how a contractor operates his plant, and to point out any inefficiencies that exist.
- (3) Recommend to the contractor ways to improve his operation.
- (4) Persuade the contractor to accept the recommendations and to

discontinue the use of old inefficient operations as standards for estimating future costs.

Normal procurement methods have not always led to adequate improvements in contractor efficiency. Should cost studies, however, have lead to these improvements. More efficient contractor operation almost always results in lower prices for military weapons systems. If properly administered, should cost can lead to improvements in contractor efficiency and lower procurement costs.

II. SHOULD COST ANALYSIS

Years ago, a prominent nation-wide chain of retail stores began a rigorous program of cost analysis of some of the items they bought from suppliers. This program was an investigation into the costs of production of the items under study. The thrust of the program was aimed at evaluating the efficiency and effectiveness of the manufacturing operations of the firm's suppliers. The intent of this effort was to use the resulting data to determine what would constitute a fair and reasonable purchase price for the items under study assuming the supplier was operating with a reasonable degree of manufacturing efficiency. The information obtained was applied in the negotiations for the purchase of the items. While other forms of purchase price analysis had been used before, the store had never attempted to so fully engage its suppliers. The Army Logistics Management Command [Ref. F] and Stewart [Ref. G] briefly discuss this first should cost approach to contract pricing.

In recent years the Armed Forces have adopted an expanded version of should cost as a possible means of improving the efficiency of the military procurement system. Should cost, as it is currently employed, is discussed in the following paragraphs.

A. WHAT IS A SHOULD COST ANALYSIS?

A should cost analysis is basically a very detailed industrial efficiency study applied to defense production contracts. In the modern sense of the term, it is a management audit focused primarily upon the manufacturing operations of a given defense supplier. A should cost analysis examines all phases of the supplier's manufacturing

process, managerial capabilities, and financial position. It fully examines not only historical cost data, but the production methods used, efficiency achieved, cost allocation policies, and the contractor's managerial expertise. Should cost differs from normal price analysis methods primarily in the depth of analysis and the scope of the study. An in-depth description of the should cost concept can be found in the Should Cost Analysis Guide [Ref. H] published by the U.S. Army Material Command.

B. WHY PERFORM A SHOULD COST ANALYSIS?

The conventional method of contract price negotiation works well in situations where true competition exists among suppliers. In this type of environment, the Government can rely on the forces of free competition to provide efficient manufacturing operations. In these instances it is assumed that contractor efficiency will result in fair and reasonable prices for defense supplies.

In the sole-source environment, competitive forces are completely absent leaving the Government negotiators in a weak bargaining position. The objective of a should cost analysis is to provide government negotiators (who work in this sole-source environment) with an independent, realistic, and honest estimate of what a given production operation ought to cost if the manufacturer were to perform in a reasonably efficient manner. The alternative cost estimate produced by the should cost analysis gives the government negotiators more leverage at the bargaining table.

The output of a should cost analysis is:

- (1) An evaluation of the supplier's operation.

- (2) An estimated production contract price based on reasonably attainable economy and efficiency.
- (3) A list of recommendations by which the supplier can reach the efficiency goals of the should cost team.

During contract negotiations, the government team will treat the should cost analysis results as an alternative to the contractor's proposal. Each side (i.e. the government and the supplier) will use their own cost estimates as a negotiating baseline. When negotiations are influenced by the results of a should cost study, improved supplier efficiency and lower contract prices generally result. If, by using the should cost price as a baseline, the Government is able to achieve a lower contract price, the contractor is usually pressured into adopting the efficiency improvement recommendations necessary to meet this lower price.

The achievement of lower purchase prices for specific items is the short range goal of should cost studies. The long range goal is the improvement of the efficiency of the supplier's manufacturing operations. Rule [Ref. I] discusses the short and long range goals of should cost. Most sources agree that the major benefits that accrue from a should cost effort are the result of the long range goals of the study. Improved production efficiency provides lower contract prices to the Government for years to come.

Most recommendations made by should cost study teams call for changes that would have come about without outside pressure had the company's management looked closely into the situation. Radical, sweeping changes are rarely suggested by a should cost team. The impact of should cost comes from the re-directing of management

attention toward neglected (and thus inefficient) areas, not from increased government control over contractors. In the absence of market competition, should cost is a means of providing the pressure to urge improvements in production efficiency.

C. WHEN IS A SHOULD COST ANALYSIS CONDUCTED?

A should cost analysis is conducted whenever the following conditions are met:

1. Benefits Exceed Costs

The Government must believe that the benefits derived from such an effort will exceed the costs. It is expensive to maintain and support a should cost team at a supplier's plant. Stolarow [Ref. J] estimated the cost of the should cost study done in conjunction with the MK-48 torpedo procurement to be approximately \$4 million. Coleman [Ref. K] discusses the MK-48 study in detail. This particular study was unusually expensive, but even relatively small studies usually cost in the hundreds of thousands of dollars. These costs must be weighed against the possible benefits that a should cost study is capable of providing. The following list describes some of the benefits which have resulted from recent should cost studies:

- (1) Contract price reductions as in the case of the Hawk Missile study [Ref. S].
- (2) Improvements of contractor efficiency as in the case of the Pratt & Whitney study [Ref. I].
- (3) Improvement in government procurement practices as in the case of the GAO studies [Ref. T].

2. Sufficient Manpower is Available

A should cost study can require that a large team of government specialists be assigned to the supplier's plant for a long period of time. The should cost study done at Pratt & Whitney required that over forty high ranking government procurement specialists be maintained at the factory for more than three months. Rule [Ref. I] and Freeman [Ref. L] both comment on the demands for manpower made by a should cost study.

3. Sufficient Time is Available

To be effective, a should cost study must be carefully planned and competently administered. If ample time is not available, the study will have to be hurried or abbreviated. The resultant degradation of the quality of the output of such a study can make its worth questionable. Before a should cost study is undertaken, it must be assured that contracting pressures or needs of the service will not unduly limit the time available for the study. The length of time required may be from three months to as much as a year.

4. Government Agencies Can Spare the Manpower

In the majority of the should cost studies, the manpower required is drawn from both the military and the civilian agencies within the Government. The specialists which make up should cost teams are usually very talented employees who occupy key positions in their respective agencies. When these talented people are removed from their normal jobs for the duration of the study, their agencies are often severely disrupted.

5. Contract Conditions Are Proper

Procurement, Should Cost by the Headquarters, U.S. Air Force [Ref. M] discusses criteria which must be met if a should cost analysis is to be considered appropriate. All military services performing should cost studies abide by these criteria. These criteria are listed below:

a. **The Supplier Must Do a Predominant Amount of Business with the Government.**

If the contractor does a significant amount of business in the civilian marketplace, he will be forced by the pressures of competition to be efficient. It is assumed that this efficiency will carry over into his work for the Government. If sufficient civilian business is absent, a method such as should cost may be necessary and justified.

b. **The Contractor Must Be a Sole-Source Supplier.**

If there is more than one source of supply for the item being procured, it is fair to assume that there will be some form of price competition among these suppliers. Furthermore, if price competition exists, efficiency of operations and reasonable price proposals are assumed to result.

c. **There Must Be a High Probability of Significant Follow-On Business.**

There must be a high probability that a significant amount of government business will be awarded to the supplier at some future date. It would not be economical to conduct a detailed should cost analysis if only the immediate short range goals would be realized. The full impact of a should cost study cannot be achieved if

the long range goals are ignored. To reap the benefits of the long range efficiency improvements, the Government must do follow-on business with the supplier.

d. The Contract Must Be of High Dollar Value.

If the contract is not of high dollar value, the cost of doing the should cost study will probably exceed the possible savings that the study will bring about. Only high-dollar-value procurements are qualified for a should cost analysis.

e. Substantial Increase in Prices with More Increase Likely to Follow.

The situation must be one where the production contract price has risen substantially from the original estimate and further rises appear likely to occur. Significant price increases not related to design changes usually indicate some type of operating inefficiency.

D. HOW IS A SHOULD COST ANALYSIS CONDUCTED?

Every should cost study is unique because the circumstances which surround each individual procurement vary. However, while the details of each analyses differ, all analyses adhere to the same basic pattern described below:

1. Determine That a Study is Needed

This decision is usually made by the activity in the Defense Department that is buying the item in question. The decision may also be made by the Material Commands of the three services. Since the decision to conduct a should cost study involves the allocation of so much time, money, and effort on the part of the Government, it is not made lightly.

1. Determine the Magnitude of Effort Required

The team size has varied from service to service, but generally it has related to the dollar value and the complexity of the contract to be studied. The determination of team size must include consideration of possible sources of the desired manpower. The depth of analysis and the scope of study desired must be determined at this stage of planning since these factors will have a direct bearing on the size of the team, the degree of talent required, and the length of time the study will require.

3. Advance Team Visits Supplier's Plant

While the should cost team is being formed and organized, the contractor is notified of the impending study. An advance team is dispatched to the supplier's plant to explain what the study will involve, what is expected of the contractor, and what the study hopes to accomplish. The advance team makes a cursory study of the operation to determine where the problem areas generally lie. The advance team also arranges for the maintenance and support of the full team at the production facilities.

4. Orientation Period of the Full Team

When the full should cost team arrives at the supplier's plant, the team members are given an orientation tour of the facilities. Once they have familiarized themselves with the operation, the should cost team begins a review of reports and financial records in order to locate areas that seem to be incurring higher than normal costs. Subsequent investigations are focused on these high cost areas.

5. Analysis Phase

The should cost team performs a very detailed industrial efficient analysis. The analysis is, in essence, a management audit expanded to provide an analysis of the causes and justifications of reported costs. The thrust of the study is to question the validity of the data presented by the contractor in his price proposal. As discussed by Siewert [Ref. G], in many non-competitive situations, the contractor bases his proposed price on data that he has gathered from previous operations. In almost every case this data is presented accurately and honestly by the supplier. However, if the data is based on past inefficiencies or includes the effects on non-reoccurring problems, the proposed contract will be unnecessarily inflated. It is the purpose of the should cost study to bring to light these invalid cost assumptions and inefficient methods.

Stolarow [Ref. J] lists ten areas usually examined in a typical should cost study:

1. Plant Layout
2. Labor Standards
3. Material Control
4. Machine Loading and Utilization
5. Production Scheduling
6. Make-or-Buy Practices
7. Subcontracting Procedures
8. Quality Control Procedures
9. Indirect Cost Controls and Allocations
10. Accounting and Cost Estimating Procedures.

The Handbook of Modern Manufacturing Management by H. B. Maynard

[Ref. N] contains an excellent discussion of these and other related areas of interest.

6. The Analysis of the Data

When the study has been completed, the should cost team carefully analyzes the data that has been generated. Using the findings and conclusions of this analysis, the should cost team will make a list of recommendations for both the supplier and the Government to adopt. Under the assumption that the contractor will adopt all recommendations directed at him for his improvement and efficiency, the should cost team develops its estimate of what the production contract "should cost" to complete. The team then adds a reasonable profit margin to its cost estimate and thus produces the "should cost price" of the contract for the Government.

7. The Negotiation of the Contract

Once the should cost team has completed its work, the government contract negotiators have the responsibility of using the study results to obtain the best possible contract agreement for the Government. In a normal contract negotiation, the contractor submits a proposal to the Government. Using data supplied by the contractor, the government team attempts to bargain downward from the submitted proposal. When a should cost study has been conducted, the report and conclusions of the study will be used by the Government as a counter-proposal to the contractor. The should cost price will be used by the Government as its negotiation baseline and the contractor will use his proposed price as his baseline. Negotiations will consist of a series of concessions by both sides until an agreement is finally reached.

It is a mistake to believe that the should cost price is the only price that is fair for the Government. In many cases, the recommendations upon which the should cost price is based would require large financial outlays by the contractor. Often these outlays involve a degree of risk, and in every case, the return from the outlay is not immediate. The contractor may have very sound, valid reasons for opposing the changes suggested by the should cost team. The Government, on the other hand, bears little risk in suggesting the changes, but stands to benefit greatly from any resulting savings. Theoretically, the equilibrium point must lie somewhere between the contractor's proposal and the should cost price. The exact price finally agreed upon will depend on the bargaining powers of the two negotiating parties.

E. WHO PERFORMS SHOULD COST ANALYSES?

At present, all three major branches of the Armed Forces and the General Accounting Office have adopted the should cost concept. While each agency's version of should cost is based upon the same general principles, the differing needs and purposes of these agencies have resulted in marked variations in the characteristics of the studies performed.

1. The Navy

The United States Navy was the pioneer of the use of should cost in the Department of Defense. It was the Navy that conducted the first should cost study in 1967 at the Pratt & Whitney division of United Aircraft. Rule [Ref. 1], and Gwinn [Ref. 0] describe the Pratt and Whitney study from opposing point of view. While the Navy was the trail-breaker for should cost and is convinced of the poten-

tial the concept possesses, the Navy does not consider should cost to be the answer to all difficult procurement problems. Coleman [Ref. P] describes should cost as "no panacea." The Navy prefers instead to employ should cost only as a last resort when all other methods of cost control have failed. The General Accounting Office [Ref. G] states that Navy officials have indicated that the Navy will probably not conduct should cost studies in the future. It will instead attempt to improve normal contracting procedures to the point where should cost studies will not be necessary.¹ To date, the Navy has completed only two studies. A third was attempted, but its effect was overshadowed by the acute financial difficulties of the contractor under study.

Both of the efforts completed by the Navy have been massive, wall-to-wall investigations of the contractor's operations. The Navy tied its studies to particular contracts, but concentrated on generating improvements that affected a much larger segment of the contractor's business with the Government. The Navy believes that the most beneficial time during the contracting process to conduct a should cost study occurs when the Government is in a position to arbitrarily dictate a contract price. As Rule explains [Ref. I], this time might come during the definitization of a letter contract or a fixed-price-incentive (successive target redetermination) contract. In certain of these cases, the government contracting officer is able

¹In a lecture given at the U. S. Naval Postgraduate School 31 Oct. 1972, RAdm. R. G. Freeman, the Deputy Chief of Naval Material (Procurement and Production) indicated that he believed that should cost studies in the Navy would be conducted on an infrequent, selective basis.

to dictate unilaterally the contract price (subject to possible dispute at some later date). The contracting officer bases his price on the should cost study findings. To win an increase in price, the contractor must disprove the findings and defend his methods of operation.

2. The Army

The United States Army is in somewhat of a different procurement situation than is the Navy. It does not have nearly as many major systems under development as does the Navy. Consequently, it is in a position to more carefully monitor the progress of those systems it is acquiring. The Army did not adopt should cost as quickly as did the Navy. Once it had adopted the concept, the Army quickly became an enthusiastic supporter. The Army considers should cost to be an excellent method of controlling contract prices. An article in Federal Contracts Reports [Ref. R] discusses the Army's satisfaction with should cost. General Miley [Ref. S] states that the Army has completed fourteen should cost studies thus far and has five more in progress at the present time.

Army should cost studies are far more regulated and institutionalized than are those of the Navy. The Army has published thorough guidebooks [Ref. H] and regulations covering the conduct of an Army should cost study. The Army maintains a "should cost library" and a five-day should cost school for prospective team members at Fort Lee, Virginia.

Army should cost studies are tied closely to a particular contract. The studies are made on relatively small dollar value contracts and are made by small teams of men. Each study strives to

achieve long range improvements, but significant effort is directed specifically toward the contract under study. The studies themselves are rather truncated, dealing for the most part with the more glaring discrepancies uncovered by the advance team. The entire study usually requires no more than nineteen weeks to complete. At the conclusion of the study, a very detailed report is written describing fully the team's actions and findings. This report serves as the cornerstone of the position taken by the Army negotiators. Responsibility for the conduct of Army should cost studies lies with the Army Material Command.

3. The Air Force

The United States Air Force was the last of the three services to adopt Should Cost into its procurement practices. Like the Army, the Air Force has relatively few major weapons projects under development. Hence, the Air Force has the time and manpower to closely supervise each project. The Air Force was initially under no great pressure to modify its procurement techniques since it was able to perform relatively well using conventional methods. The Air Force was able to take the time necessary to observe the development of should cost in the other two services, and then adopt those portions of the concept which it felt would be valuable to the Air Force.

The Air Force felt that the approach to should cost taken by the Army was the most compatible with Air Force needs. As a result, the Air Force version of Should Cost is very similar to that of the Army. A great similarity can be found between the Air Force Should Cost Pamphlet [Ref. M] and the Army Should Cost Guidebook [Ref. H].

There are certain differences between Army and Air Force should cost philosophy, however, owing to a large extent on the greater emphasis exhibited by the Air Force on research and development. The Air Force includes a greater degree of flexibility in its studies than does the Army. The Air Force places more emphasis on the long term goals of should cost than does the Army. The responsibility for the performance of Air Force should cost studies rests with the individual buyer commands. In order to achieve some degree of centralized control over studies, the buyer commands must include a description of the proposed studies in the Advanced Procurement Plan (see paragraph 1-2100 of Ref. B, or Phase I, page 10 of Ref. C). Thus far, the Air Force has completed eighteen studies and has one in progress at the present time.²

4. The General Accounting Office

At the request of the Subcommittee on Economy in Government, Joint Economic Committee, the General Accounting Office (GAO) undertook a number of should cost studies to determine if the concept would be useful as part of GAO audits of Defense Department procurements. The GAO report to Congress [Ref. Q] describes the background and the findings of these studies. It was decided that should cost was indeed able to provide information valuable for the evaluation of actions taken by military procurement agencies. The GAO conducts should cost studies primarily as a means of monitoring the effectiveness of the military procurement agencies.

²William Shaeffer, Lt. Col., USAF, AF/ACPLB, phone conversation on the subject of Should Cost in the U. S. Air Force, 21 Dec. 1972.

The GAO believes that the true value of should cost is in the attainment of long range efficiency improvements in contractor operations. It does not agree with the philosophy of tying the study to a particular contract. The GAO believes that more benefit could be gained if the study was a broad investigation of all phases of the contractor's operations.³ To obtain the cooperation of the contractor, the GAO advocates keeping him fully informed of the progress of the study. It is felt that if the study can show definite areas where money can be saved, then the contractor will be more than willing to cooperate. Since it uses should cost as a means of monitoring military procurement agencies, the GAO conducts its studies in the post-award environment.

³Gerald Marks, Supervisor of Industrial Engineering, General Accounting Office, phone conversation on the subject of should cost in the GAO, 9 Jan. 1973.

III. PROBLEMS AND LIMITATIONS WITH CURRENT SHOULD COST METHODS

The Should Cost Analysis concept has tremendous potential for helping to control rising defense costs. Should cost studies have already served to strengthen the Government's negotiating position in regard to several major defense contracts. As a result, this concept has already saved the American taxpayer many millions of dollars. Nevertheless, as this chapter explains, current should cost techniques are not without their shortcomings. If these problems can be overcome (or at least minimized) the should cost concept will become even more valuable in the future.

A. EXPENSE

The should cost studies which have been performed thus far have been very expensive undertakings. As mentioned in chapter II, the MK-43 Torpedo should cost study cost approximately \$4 million. It costs a great deal of money to maintain a team of ten or twenty men comfortably and productively at a contractor's plant for a period of three or four months. Gordon Frank in a paper titled Value Engineering and Should Cost [Ref. U] estimated the costs of studies to range from a low of \$50,000 to a high of \$1 million.

As the Army Should Cost Guide [Ref. H] explains, a should cost team must be provided with transportation, office space, supplies, clerical help, communications facilities, and ready access to contracting and industrial reference material. In addition, the team members must be fed, housed, and have all routine personal needs cared for. There are also administrative functions that must be

performed by the military commands in order to support the should cost teams and make proper use of the team's output. These functions include:

- (1) providing for the support of the team at the plant,
- (2) handling, processing, and making decisions on the data reported by the should cost team, and
- (3) performing routine military administrative duties pertaining to the should cost team members.

At present, each service provides and maintains its own organization for managing and administering should cost studies. Consequently, there exists a degree of duplication of many functions among the services. None of the individual duties that compose the support of a should cost study can be deleted. It is wasteful, however, to duplicate many of the functions in all three services. For example, the data generated by a should cost team must be carefully processed before any meaningful conclusions can be drawn from it. Each service has their own system for data processing. It is not practicable in most cases to develop efficient computerized data processing systems (like PEGASUS [Ref. V] of the MK-48 torpedo study) for relatively small studies. Therefore, each service must create its own data processing system tailored to suit its own particular techniques.

B. MANPOWER

The manpower for each should cost study is drawn from both the military and other government agencies (e.g. the Defense Contract Audit Agency and the Defense Contract Administration Service). If a should cost study is to have a chance to succeed, it must be staffed from the beginning with very talented people. Quite often, those

selected for a should cost team are key people in their own agencies. Their loss, albeit temporary, creates hardships and costly inefficiencies in their own organizations. It is not advisable to lower the standards of qualification for service on a should cost team. Freeman has indicated [Ref. L] that a lower quality of personnel on should cost teams would make the studies ineffective.

Each should cost study is independent of all others, and each study is terminated after a specified length of time. Once a should cost study is completed, the team members are no longer needed (the Army and the Air Force, however, both retain the head of the should cost team to serve as the chief contract negotiator). Since all the services approach should cost studies on a case by case basis, it is not feasible for them to hire and maintain a permanent should cost staff. This leaves the services with no alternative but to draw manpower from their own and other governmental agencies. If the agencies cannot spare the manpower, the should cost study cannot be conducted. The limited availability of acceptable manpower has often been one of the factors that blocked the decision to conduct an otherwise desired should cost study.

C. EXPERIENCE

At the supplier's plant, a significant part of the should cost team's time is spent learning the complexities of conducting a should cost study. The Army and the Air Force make use of a five-day school to familiarize prospective team members with the fundamental concepts of should cost. The Navy and the GAO have no such training program. Miley has indicated [Ref. S] that even the most careful selection process cannot guarantee the effectiveness of a man when he is placed

on a should cost team. The five-day school does help, but it is no substitute for the skills and knowledge acquired from experience.

Both the Army and the Air Force Should Cost Guidebooks [Ref. H] and [Ref. M] go into considerable detail about the necessary characteristics of a should cost team member. If it were possible to utilize the same men on many successive studies, it is more likely that a higher degree of professionalism could be attained.

Miley [Ref. S] mentions the effort made by the Army to have competent personnel on its should cost teams. In spite of very thorough screening, it is often impossible to evaluate correctly the effectiveness of a prospective should cost team member until he has been a part of a study. When a man proves unsuitable or incompetent, it is the Government and ultimately the taxpayer that must bear the expense of replacing the man and correcting the mistakes he has made. As long as should cost teams continue to be composed of a high percentage of inexperienced men, the risk of using unsuitable personnel remains.

D. PROBLEMS RELATED TO THE CONTRACTOR

In addition to problems related to the staffing, support, and administration of a should cost study, there are a number of problem areas directly affecting the contractor.

1. Disruption

As mentioned by W. P. Gwinn [Ref. O], when a should cost study is performed on a contractor, his schedule of operations is invariably upset. The should cost team spends many hours at the contractor's plant observing the manufacturing process and talking to employees. The team makes every effort to be as unobtrusive as

possible. Yet in spite of its best intentions, the team's presence has a detrimental effect on the normal routine. It is also necessary for the contractor's management to divert a large portion of its valuable time to answering questions of the should cost team.

2. Parochialism

In the majority of should cost studies, the emphasis is directed toward one particular contract. There is no strong incentive for a service to utilize its should cost studies to generate improvements for other services.¹ Any benefits that do accrue to other services are merely spin-offs of the primary goal of the study. The nation as a whole would benefit if all should cost studies were directed at improving all phases of a supplier's operations rather than being confined to a particular contract situation [Ref. Q].

3. Cooperation

The keystone of any successful should cost study is the cooperation of the contractor being studied. If he withholds data, refuses to discuss problems with the should cost team, or refuses to supply necessary facilities, then the study will not yield the benefits it is capable of providing. The military relies on financial leverage (e.g. it is a sole buyer of defense items) or on quirks of the specific contract situations (e.g. unilateral price determination of letter contracts) to obtain contractor cooperation. The GAO promises worthwhile recommendations for cost savings as an incentive for cooperation. The GAO report [Ref. Q] discusses methods of

Mr. James Fowler of the Office of the Supervisor of Industrial Engineering, General Accounting Office. Phone conversation on the subject of Should Cost, 9 January 1973.

obtaining contractor support. Neither the military approach nor the GAO technique is powerful enough to guarantee that the should cost study will be able to produce savings proportional to the cost of the study. Too often, the methods of inducement to cooperate only work on weak or financially distressed contractors. These contractors would be likely to bargain reasonably if only normal contract negotiation methods were forcefully employed. For a contractor to allow a should cost team into his plant is one thing, but cooperating with it and yielding to its recommendations is an entirely different matter. Current should cost practices do not wield enough power to fully realize the true potential of the should cost concept.

4. Credibility

One of the early obstacles to be overcome by a should cost team is the low credibility assigned to the team by the contractor. An article in Federal Contracts Report No. 449 [Ref. W] discusses the doubts expressed by industry leaders on the subject of should cost studies and team members. Even though a should cost team is composed of highly skilled men, the contractor usually views them as outsiders who do not really understand all the intricacies at play in the manufacturing environment. Gwinn [Ref. O] states, many contractors feel that the should cost team is not fully aware of the total environment of the particular industry being studied. It is feared that a team that must spend so much time learning about the industry will not be well qualified to recommend corrections and improvements. As long as should cost efforts remain diverse, decentralized, and composed of inexperienced personnel, industry will remain suspicious of the worth of the studies.

D. NOT ENOUGH SHOULD COST STUDIES BEING DONE

In fiscal year 1972, the Federal Government spent about \$19 billion for the procurement of military hardware.² The majority of this money was spent on sole source negotiated contracts for sophisticated weapons systems. In spite of the large number of sole source procurements made by the military in recent years only forty-four should cost studies have been done (including ten by the GAO which were not directly related to any contract). There can be little doubt that there is room for more should cost studies.

The reason that more studies have not been conducted thus far is that they place too great a burden on the armed services. As Freeman explains [Ref. K], should cost studies require excessive amounts of time and manpower to permit their frequent use. A great deal of preparation must be made by the military procurement agencies before a study can be conducted. In the already hectic atmosphere of weapons procurement, this preparation can be an intolerable burden.

The real value of a should cost study lies not in the short range benefits of immediate contract price reduction, but in long range benefits realized over a period of years from contractor efficiency improvements. The military must have money to function. It exists from year to year and budget to budget being careful to justify each action and request. While all services recognize the importance of long range improvements, their actions must yield short range benefits as well. A should cost study must also be able to provide

²

_____ Federal Contracts Report, No. 455, 29 January 1973,
pages B-1, 2.

immediate benefits to the service if the study is to be undertaken. Consequently, many studies that would be of great value to the tax-payer after a period of years are not conducted because the services are incentivized for short range goals rather than long range goals.

E. LACK OF TOTAL INDEPENDENCE

One of the more subtle shortcomings of our present method of dealing with should cost studies in the military is that, when viewed from a broad perspective, both the military and the contractor have the same objective. Both parties want to produce and deploy weapons systems with the minimum amount of turmoil and confusion. There is no serious doubt that military procurement officers are as honest and honorable as any other group of men in the country. They make every effort to act in the best interest of their country as they see it. Any suggestion that collusion and misdealings in military procurement agencies are the cause of current weapons acquisition difficulties would be foolish and irresponsible. Yet it cannot be denied that the common goal military procurement officers share with the contractor must tend to preclude a totally objective, independent attitude toward contractor performance.

A should cost study is not intended to set a contract price. Instead, it is intended to provide the government negotiators with a stronger bargaining position. If, in the interest of expediency (or some other service-oriented pressure), government negotiations do not fully exploit the strengths of their bargaining position, then the best interests of the nation may not have been served. At present, there is no systematic review of contract negotiations to ensure that the results of should cost studies are being utilized as effectively as possible.

It is human nature to assume that the cause of the problem lies with the other guy. In spite of the most well intentioned efforts to the contrary, government run studies often tend to overlook faults of the Government. A truly independent body would be able to see errors that an even slightly biased body might overlook. It would be better in the long run if future cost studies were conducted by an agency fully independent of the military or the contractors.

IV. IMPROVEMENTS NECESSARY FOR MORE
EFFECTIVE UTILIZATION OF THE
SHOULD COST ANALYSIS CONCEPT

The should cost analysis concept is a technique which can enable government contract negotiators to extract more real value from dollars expended for defense. Problems exist in the current methods of employing the should cost concept which prevent it from achieving its full capabilities. If should cost is to reach its maximum potential effectiveness, changes must be made in the manner in which the concept is being utilized. The following paragraphs are recommendations for changes which will help to make the should cost concept more beneficial.

A. RESPONSIBILITY

The responsibility for the conduct and coordination of all should cost studies ought to lie with one single agency. There are important benefits that would be gained if all should cost studies were directed by one single authority rather than by four as is currently the case. These benefits are:

1. Minimize Duplication

Should cost studies conducted by a single central agency could be planned so that the results of the studies would be useful to all interested services. It would thus be possible for each service to make use of the results of a single comprehensive study rather than have each service conduct its own truncated study. While this would make the combined study more difficult to plan and conduct, it would be cheaper and more cost-effective than conducting two or three similar

studies. Naturally, a unified should cost study could seldom be used for the actual negotiation of more than one contract. However, the scope of such a study would be broad and the emphasis would be on identifying long range inefficiency problems. The results of the study could be used by government negotiators from all three services for several years.

2. Better Contractor Selection

A central agency in control of all should cost studies would be able to base its selection of contractors on the needs of the nation rather than the needs of the service. The resources of a central agency could be directed toward those contractors in most need of study (regardless of service affiliation). Constraints arising from service boundaries and spheres of influence would be avoided. A central agency, independent of the military, would be able to view objectively the overall defense procurement environment.

3. Better Information Dissemination

A central agency could be charged with the responsibility of systematically disseminating information on the results of all should cost studies. This centralized reporting would be a necessary step if unified should cost studies are to benefit all three services. Service procurement agencies must have ready access to the results of should cost studies done on suppliers with which they are planning to negotiate. Currently there is very little inter-service transfer of should cost information.¹

¹In the course of conducting research for this paper, the author discussed should cost with many officials within the military. While all seemed extremely familiar with the experiences of their own service, few were able to discuss the application of should cost in the other services. It must be concluded that there is little cross-fertilization between should cost studies performed by different branches of the Armed Forces.

B. EXPERTISE

A single agency charged with the responsibility of conducting all should cost studies should support, maintain, and utilize a permanent should cost staff. This staff could be composed of experts in industrial engineering, engineering, law, finance, and management. In time, this staff could be built into a very capable group of people with experience in the should cost concept. If such a staff could be created, it would be necessary to select, train, and evaluate new personnel less frequently than is now demanded.

The permanent should cost staff would supply the key manpower for routine studies. It would serve to coordinate larger studies which would be conducted by civilian consulting firms (as was done with the MK-48 Torpedo [Ref. V]). If a permanent staff could be created, a high degree of should cost "professionalism" could be cultivated. The staff members would soon become familiar and proficient with should cost studies. Contractors would be less doubtful of the should cost team's ability, and would be more willing to voluntarily accept the should cost teams recommendations.

C. EMPHASIS

The emphasis of unified should cost studies must be toward identifying problem areas that affect the suppliers entire operation. To fully justify the time, money, and effort of an expanded should cost study, the findings of that study must be of value to all agencies of the Government who might someday do business with the contractor. Currently, should cost studies are concerned primarily with satisfying the needs of the military service which sponsors the study. Future unified studies must generate recommendations that will benefit all services rather than just one.

The emphasis of unified studies must be placed on locating long range efficiency improvements to the supplier's operation. These long range improvements will help to keep procurement costs low for many years to come. The usual short range goal of current should cost studies (a lower contract price) will not be a major objective of unified studies since this objective can only benefit one agency.

D. INDEPENDENCE

The agency charged with the responsibility of conducting all should cost studies must be completely independent of both the military and the defense industry. To be truly effective, a should cost study must be able to take a completely objective look at each facet of production operation. It must not be influenced by:

- (1) the needs of any particular group,
- (2) any pressures felt by any party involved, or
- (3) any factor not related to the efficient completion of the contract.

There are many agencies not directly related to either the military or to the defense industry who are in a more independent position than are the military procurement agencies. For example, the Treasury Department, the Office of Management and Budget, and the Department of Commerce could be relatively independent of military or contractor influences. These independent agencies would be much more likely than are the military agencies to attack sensitive areas of the contract and to question the Government's position. The military agencies are influenced by a need to obtain the product, an independent agency is not.

A should cost study sponsored by an independent agency is likely to make the military's procurement job more complex. The agency will challenge procedures used by the military which appear to be inefficient. It will also be less inclined to allow the contractor to continue inefficient practices for the sake of expediency. The goal of a unified should cost study would be to make more efficient use of tax revenues, not merely to reduce contract prices.

E. CAPABILITY

Any agency charged with conducting should cost studies must have the capabilities necessary to perform the studies well. These necessary capabilities include:

1. Knowledge of Financial Reporting

A facility for dealing with financial data is vital for an agency that conducts should cost studies. The agency must be able to deal with the contractor's financial experts on an equal basis. To conduct a useful study, a should cost team must be able to understand and intelligently discuss the contractor's financial position. To understand his financial position, the should cost team (thus the agency) must be able to understand the contractor's programs policies, and problems. This, in turn, requires a familiarity with current financial practices and reporting techniques.

2. Knowledge of Industrial Engineering

The agency conducting should cost studies must be familiar with the aspects of industrial engineering that relate to weapons production. If a should cost study is to determine where efficiency problem areas lie and then make recommendations for improvement, then a thorough knowledge of the practical aspects of industrial engineering is required.

3. Team Spirit

One of the key pre-requisites for a successful should cost team is the ability to cooperate and function as a team rather than as a group of individuals. Any agency undertaking a should cost study must share the philosophy of close team coordination in its day-to-day activities. Its people must have been exposed to the pressures of and they must have performed well under team conditions.

4. Broad Economic Viewpoint

If a single agency is to be given total responsibility for conducting all should cost studies, then that agency must be one that is able to think in terms of the entire national economy. The agency must have a broad perspective on the needs of the military and the capability of the economy to absorb the cost of meeting those needs. It must be able to appraise realistically the relative strengths and weaknesses of the defense industry and of the particular contractor under study. All this requires access to and familiarity with the financial and economic plans of the Government. It also requires the ability to make use of whatever financial data that is available from the contractor.

5. Influence

It is important that an agency which conducts all should cost studies be in a position to spread its findings around to other interested parties. If the military procurement agencies do not receive or do not pay heed to the results of a should cost study, the possible benefits of the study will be lost. The agency should have the capability of monitoring the procuring activities and the defense contractors to insure that the should cost efforts are not being ignored or unnecessarily compromised.

6. Ability

If future should cost authority is to be vested in a single agency, that agency should be given the ability and the authority to conduct a greater number of studies than are currently being undertaken. There are literally thousands of military procurement actions each year that would benefit significantly from a should cost study. Because of a lack of manpower, time, and/or money, only a handful of studies are done each year.

V. THE GENERAL ACCOUNTING OFFICE
AS THE SOLE AGENCY FOR THE
CONDUCT OF SHOULD COST ANALYSIS

There are a number of Federal agencies that have the capability of assuming the role of sole should cost agency. Among these candidates are; the Department of Defense, the Office of Management and Budget, the Treasury Department, and the Department of Commerce. Each of these agencies has an interest (direct or indirect) in the funds expended for weapons systems. However, it is this writer's opinion that the General Accounting Office (GAO) is a far better choice than any of these other agencies. The bases for this writer's opinion on the matter is discussed in this chapter.

A. WHY SELECT THE GAO?

1. Capability

The GAO has proven itself to be fully capable of conducting should cost studies. It has already successfully conducted four studies on civilian owned firms [Ref. Q.] and six studies on governmental owned facilities. The staff of the GAO would have to be enlarged if all should cost were to become its responsibility. The GAO has shown, however, that its people are able to perform these studies effectively.

Since the GAO deals primarily with financial matters, it clearly has the capability to probe intelligently into the financial data and reports of a contractor. The GAO's long history of conducting audits provides an excellent foundation upon which to build an organization to conduct should cost studies. Regardless of the connotation of

the title "Should Cost Analysis", such studies are actually no more than detailed management audits of the industrial practices of contractors. The GAO currently refers to a should cost study as an "Industrial Management Review" [Ref. T]. When the audit (or Review) has been completed, the GAO should cost team carries the results further to generate recommendations for improvements and to estimate a should cost price for the contract.

2. Organizational Purpose

The GAO is charged with the responsibility for monitoring the manner in which government agencies expend the funds allocated to them by Congress. Each year, the GAO reports to Congress on how funds were spent, what deviations from budget occurred (if any), and how effective the various agencies' managements were in controlling their expenditures of funds. Harris [Ref. X] provides additional insight into the functions of the GAO.

Over the years the GAO's authority and responsibility have been expanded to include more than just the duties and responsibilities of an accountant. Now, the GAO not only investigates the validity of reported costs, but it also evaluates the practices that led to the incurrence of the costs.

In the 1972 publication Standards for Audit of Governmental Organizations, Programs, Activities, & Functions [Ref. Y] the Comptroller General of the United States stated that:

"...auditing is no longer a function concerned primarily with financial operations. Instead, governmental auditing now is concerned with whether governmental organizations are achieving the purposes

for which programs are authorized and funds are made available, are doing so economically and efficiently, and are complying with applicable laws and regulations."

A should cost study is, in reality, a version of the types of audits contemplated by the Comptroller General in the preceding quote.

The GAO has the authority to monitor the expenditures of the various military procurement agencies. The should cost analysis concept is an excellent method for monitoring certain of these expenditures. Since should cost is similar to the modern GAO audit, sole should cost authority would be a logical expansion of the GAO's present duties.

The four should cost studies previously previously performed by the GAO on civilian owned companies were conducted to determine if should cost would be a useful technique for use by the GAO in audits of military procurement agencies. These GAO studies did, in fact, prove to be of value in evaluating the procurement agencies and the procurement process. If the GAO were to perform a greater number of should cost studies, it would be better able to carry out its present function as a monitor of military expenditures.

3. Vantage Point

The GAO is in an excellent position to observe the impact that a should cost study has on the entire federal budget. The GAO's duties as monitor of federal expenditures provides it with a broad overview of the economy and the defense industry. This overview would give the GAO a unique advantage in selecting contractors for should cost studies. Current should cost study selections are made

to maximize the benefits received by a single agency (or service). If the GAO were the sole agency conducting should cost studies, it could select contractors in a manner that would maximize the benefits to the national economy as a whole.

4. Independence

The GAO is reasonably independent of the military establishment. It is also reasonably independent of the Executive branch of the Government. Independence is an important attribute for an audit function. The GAO's independence would permit it to report freely any inadequacies it discovered in governmental agencies. The same independence would permit the GAO to employ should cost in a manner which would best suit the needs of the nation as a whole. A military should cost study team, on the other hand, might be tempted to yield to pressures to expedite their study in order to allow a contractor to begin delivery of his product as soon as possible. Since the GAO is not directly related to the military or to contractors, it would not be influenced by such operational pressures.

The GAO is also in a better position to criticize objectively the military procurement procedures. For example, in the Navy study of Pratt & Whitney, only one out of a total of seventy-four recommendations for improvement was directed toward the Government [Ref. O]. On the other hand, the original four studies by the GAO listed many areas in which the Government was at fault [Ref. Q].

5. Influence

As explained by Harris [Ref. X], the GAO wields considerable financial power over the agencies it monitors. In addition, the Congress relies heavily upon the GAO's recommendations concerning

fiscal policy and budget allocations. This power, coupled with the authority of the GAO to audit agencies at its discretion, gives the GAO tremendous influence over the military procurement agencies. Consequently, a should cost study conducted by the GAO would carry more weight with the military procurement agencies than would a similar study conducted by a military team.

Upon completion of a military should cost study, the results are turned over to the government negotiating team. During contract negotiations, the government team is free to use the results of the study as they see fit. The degree to which the government team pursues the should cost study objectives may be influenced by many other factors such as expediency, needs-of-the-service, or pressures from operational commanders. Thus, when only the military is involved, all the potential benefits of a should cost study may not be fully realized.

A should cost study done by the GAO would be likely to be more influential in contract negotiations. The military procurement agencies would still be free to make whatever use they saw fit of the should cost study results. However, the subsequent procurement contract would be subject to audit by the GAO in light of the GAO should cost study conclusions. Thus, the military agencies would be forced to explain and defend their utilization of the results of the GAO studies. In addition, other contracts negotiated with this same supplier at some later date could still be reviewed by the GAO in light of the original study. Thus, should cost studies conducted by the GAO would have a significant immediate impact on current contract negotiations, and would also have an effect on contracts negotiated in the future.

6. Teamwork

The conduct of an audit of a governmental agency is a very complex task. All efforts of the auditing team must be carefully coordinated during all phases of the procedure. The GAO is experienced at conducting audits of agencies of all sizes. Over the years, this experience has developed a sense of teamwork and cooperation among GAO personnel. Like an audit, a should cost analysis also requires a team approach if an effective job is to be done. Nearly all sources of should cost information mention close coordination of efforts as a necessary prerequisite for a successful should cost study. This team spirit is an important attribute which causes the GAO to be well suited to the task of performing should cost studies.

B. PROPOSED GAO ORGANIZATION FOR SHOULD COST

1. Legal Authority

If the GAO were to assume the status of sole should cost authority in the Federal Government, it would have to be given expanded statutory powers [Ref. Q]. The GAO would have to be granted the authority to review all data on a defense contractor's facility that related to defense work. The GAO would require the following three concessions:

- (1) GAO must be able to examine the contractor's facilities,
- (2) GAO must be able to study the contractor's books and records, and
- (3) GAO must be provided with a reasonable degree of cooperation by the contractor's management and personnel.

This extra legal authority could only come from the Congress, but it

could be granted in a number of forms. This writer believes that the best form would be a modification to the ASPR. A clause could be required in every defense contract (over a specified dollar value threshhold) which would guarantee the right of the GAO to conduct should cost studies at its discretion.

2. Organization

The GAO would also have to undergo a reorganization to accomodate the new burden of should cost studies. A separate office within the GAO could be created with the sole function of organizing, conducting and reporting on should cost studies. Specialists in finance, law, engineering accounting, management, and industrial engineering activities would be required. The size of the staff would have to be determined by the number of studies which the GAO intended to perform and the depth to which the GAO intended to probe.

Small scale studies could be staffed by personnel drawn exclusively from the permanent should cost staff. If required, technical advice might be supplied by a few military personnel drawn from the appropriate military service. These small scale studies could be supported and supervised by the permanent GAO should cost staff.

Large scale studies (which required more time and manpower than the GAO was able to provide) could be contracted out to civilian consulting firms (as was done by the Navy with the MK-48 torpedo). In this case, the GAO should cost staff would serve as a coordinator for the study.

3. Reporting Results

The importance of adequately reporting the results of GAO should cost studies cannot be over-emphasized. The writing and

issuance of comprehensive reports would be one of the primary duties of the permanent GAO should cost staff. The military procurement officials (of all branches of service) would have to be able to make use of GAO studies. They would have to have complete knowledge of the findings, agreements, and recommendations arrived at by the should cost study team. The contractor would have to be fully (and formally) informed of the recommendations for improvement at his plant.

There are other groups besides the contractors and the military procurement agencies who ought to be informed of the results of should cost studies. The government Administrative Contracting Officer (ACO), his staff, and all military plant representatives should be informed of the results of the studies. These are the people who provide the day-to-day monitoring of the contractor. They evaluate the degree to which the contractor adheres to the various clauses and stipulations finally agreed upon in the contract. The GAO staff would keep these administrative personnel fully aware of the findings of the should cost studies. These people would be able to act as a quasi should cost study team. They would provide for even greater effectiveness of the should cost concept.

C. PROPOSED METHOD OF OPERATION

1. Initiation of Should Cost Studies

The ultimate purpose of a should cost study is to promote more efficient use of the nation's tax dollars. Any agency that could benefit from a should cost study ought to be able to initiate such an effort. If a single agency (i.e., the GAO) were to conduct all should cost studies, that agency would have to remain receptive to the views of the other agencies. Any of the following agencies ought

to be able to formally recommend that a should cost study be undertaken:

a. The Military.

The military services should be able to request that should cost studies be performed on specific contractors. If the military procurement officials are to be asked to turn over to the GAO one of their most promising contract pricing weapons, then they must be able to expect that should cost studies will be done at least as frequently as they are now. The prospect of having high quality studies done at no expense and with no crippling manpower drain would be a strong incentive for acceptance of the GAO as sole should cost authority. However, the military would want some influence in the selection of contractors for study.

b. The Congress

The Congress should be able to recommend that the GAO conduct should cost studies on specific contractors within the defense industry. This would provide the Congress with another tool for use in conjunction with its investigations of the defense industry. The availability of additional leverage would help to convince Congress that expanded statutory powers for the GAO is justified.

c. The GAO

The final decision of whether or not a given should cost study should be undertaken must rest with the GAO. It is the GAO that would have to provide the money, manpower, and effort that are required to perform a successful study. Hence, the performing agency should have the freedom to judge whether a study is truly needed in each particular case.

2. When a Should Cost Study Would Be Made

If it were the sole should cost authority, the GAO could base its decision of whether or not to conduct a study on the following criteria:

a. Justification

In the opinion of the GAO, the proposed should cost study would have to be one of rising production costs, a high dollar value project, and a high probability of follow-on government business. Since the GAO would be able to employ statutory powers for its authority, the other usual criteria (i.e., sole-source, preponderence of government business) could be relaxed. Freedom from dependency on financial pressure could allow the GAO to conduct its studies on a far wider range of defense contractors.

b. Ability of GAO

The GAO would have to have the necessary resources to conduct or coordinate any study that was undertaken. If the GAO was short of manpower or facilities and was unable to obtain sufficient assistance, then the GAO would have to turn down the request for a study. If a study could not be adequately supported, it could not yield its potential benefits.

c. Necessity

In the opinion of the GAO, there could be no other way to achieve a reasonable contract price. All other normal avenues of attack would have been attempted without success. One of the purposes of the GAO monitoring military procurement agencies is to promote improvements in the abilities and practices of those agencies. If should cost studies were conducted whenever minor difficulties were encountered

in military procurement, the studies would be counter-productive. They would induce procurement agencies to perform half-heartedly in the hopes that the GAO would take action and hammer the contractor into line.

3. Planning and Conducting the Should Cost Study

Having made the decision to perform the proposed should cost study, the GAO would next carefully formulate its plan of action. The GAO would conduct the study as it related to a specific contract, but the study would not need to be confined solely with contractor operations that dealt with that contract. The GAO would be in a position to recommend improvements that would affect all phases of operation that affected the Government.

The actual conduct of a GAO should cost study would be no different than those being conducted by the military at present (or by the GAO in the past). The GAO would be able to make its studies as broad as it felt was justified, as intensive as it felt was needed, and as thorough as it felt capable of doing. The actual mechanics of the GAO should cost studies would be identical to the mechanics of current studies.

The last step in a GAO study would be the writing of a detailed report of the studies findings and conclusions. All study recommendations would be listed and fully explained. Copies of this report would be sent to all interested agencies. All three branches of the Armed Forces (as well as any other government agency that might do business with the contractor) would receive copies of the report.

4. After the Study is Completed

After the GAO had completed its study and had sent its report to the appropriate agencies, the procuring agency would conduct the

negotiations. The agency could use the GAO should cost study results in the same manner in which present study results are used. It could use the results as a cost and price baseline (independent from the contractor's data) from which to begin negotiations. The military agency would use the GAO study results to try to obtain lower contract prices and more efficient contractor operation. In spite of the expanded legal authority of the GAO, the should cost price would in no way be binding on the contractor. The final contract price would depend, as always, on how well the government negotiating team does its job.

Once the contract had been signed, the GAO would be able to evaluate how effectively the government negotiators performed. Having conducted the should cost study themselves, the GAO agents would be familiar with the product, the contractor, and the circumstances surrounding the procurement. They would be able to meaningfully evaluate the trade-offs made by the government negotiation team. From this evaluation, the GAO would recommend improvements to military procurement methods.

If, at some future date, a military procurement agency desired to negotiate with a contractor who had been the recipient of a GAO should cost study, the agency would still be able to make use of the same study. Since the GAO study would have concentrated on long term goals, the military agency could base its negotiation baseline on the projected results of the should cost efficiency improvements. A quick investigation would reveal to what extent the contractor chose to incorporate the study's recommendations.

VI. BENEFITS DERIVED FROM MAKING THE GAO

THE SOLE SHOULD COST AGENCY

Thus far, the should cost studies conducted by various agencies of the Federal Government have been effective in reducing contract prices. In the opinion of this writer, the efficiency and effectiveness of should cost studies could be greatly enhanced if all future studies were conducted and controlled by one central agency.

As explained in the preceding chapter, this writer believes that the GAO is the agency most uniquely suited for this responsibility. If the GAO were granted sole authority to conduct future should cost studies, this writer further believes that several benefits could be expected to result. This chapter discusses these potential benefits.

A. BENEFITS TO THE GAO

If the GAO were to become the sole should cost agency, several benefits would most likely accrue to the GAO itself. The most likely improvement that could be expected to accrue would be a significant increase in the overall ability of the GAO to monitor and evaluate military procurement agencies. Sole should cost authority would enable the GAO to make quantitative judgements on the procurement performance selected military agencies. These quantitative evaluations could be made by comparing the final contract prices on various contracts with the corresponding should cost price generated by the should cost studies conducted on respective contractors. The resulting improvement in the capability of the GAO to monitor and evaluate military procurement agencies would aid the GAO in performing its duties as advisor to the Congress.

Sole should cost authority would most likely improve the GAO's overall understanding of defense expenditures. More should cost experience would lead to a more thorough understanding of the actual problems of defense contractors. As a result of these studies, the GAO would gain first hand knowledge of the conditions and profit margins of the various defense industries. As the GAO performed more and more should cost studies, its permanent should cost staff would develop into an elite cadre of experts on the subject of the defense industry. With this added measure of expertise and understanding, the GAO would better be able to make valuable recommendations to congress on matters concerning military spending and budget requests.

The GAO currently considers post-award surveys to be an important means of insuring that the contractor adequately fulfills his contractual obligations. If total should cost authority were vested in the GAO, it is likely that the GAO would require fewer post-award surveys. Intense should cost investigations would make post-award studies unnecessary in many cases. Even when the GAO decided to conduct a post-award study in addition to the should cost study, the post-award study would be much easier to conduct. For example, if the GAO conducted the should cost study on a contractor, the GAO agents would gain a good understanding of the details of the contractor's facilities and his products. Consequently, follow-on post-award surveys (which would provide an excellent opportunity to determine the extent to which should cost recommendations have been adopted) would be greatly simplified.

B. BENEFITS TO THE MILITARY

It is likely that the benefits accruing to the military from the concentration of should cost authority in the GAO would far out-weigh

the detriments of such a change. The most likely benefit to the military would be the tremendous savings in time, money, and manpower that could accrue to the services. Should cost studies currently consume these resources to an extent that the services can ill-afford. By far the most critical of the three resources is manpower. If the GAO were to become the sole should cost agency, the military would supply the GAO technical advise on the military implications of suggestions made by the should cost team or by the contractor. The military would not, however, be required to use its valuable, highly talented personnel to staff its own should cost study teams.

If the GAO were to be charged with conducting all should cost studies (and was adequately staffed to do so), an increase in the number of studies conducted could be expected. There are today many procurement situations for which a should cost study would be beneficial and cost effective. However, only a few studies are done each year because the military lacks the resources to conduct all the studies that need to be done. More should cost studies could be expected to yield a general improvement in contractor efficiency. Improved contractor efficiency would result in more output (i.e., more weapons) for the same input (i.e., money and time).

The GAO could be able to investigate a wider range of contract situations than the military is presently able to do. Expanded statutory powers of the GAO would free the GAO from the confines of strict dependence of financial leverage. Presently, many companies which could be improved by a should cost study fall outside the stringent criteria for study set by the military.

More subtle (but equally important) than the already mentioned benefits to the military is the fact that if the GAO conducted all should cost studies, it would better understand the position of the military with respect to the defense industry. The GAO would gain an understanding of the difficulties and problems involved in the manufacture of major weapons systems. It would understand the logic behind the many decisions made during a procurement by project management personnel. In short, having the GAO conduct all should cost studies could be expected to make the GAO more understanding of the problems relating to weapons system acquisition. It would be immensely beneficial to all concerned if informed, accurate, and comprehensive reports were made which fairly presented the military's position to the Congress.

C. BENEFITS TO THE NATION

This writer believes that the concentration of should cost authority in the GAO would provide benefits for the nation as a whole. The should cost concept would be made much more effective if all studies were done by a single competent agency. Improving Should Cost would result in more efficient utilization of defense dollars. The nation could maintain the same defensive posture for less money.

The GAO would report to Congress the results of should cost studies done and conclusions reached. The Congress would gain a better understanding of the real problems of the defense industry as a result of these reports. A report published by the Committee on Government Procurement [Ref. 2] states:

"Congress must have a clear understanding of the needs and goals for new acquisition efforts in order to exercise its responsibilities for review of Federal expenditures and the allocation of national resources."

Rayburn [Ref. AA] argues that this nation's past emphasis on weapons research and development has resulted in neglect of necessary development of non-defense industries. As a consequence of this neglect, the United States has lost much of the technological pre-eminence it once enjoyed. While cost studies would not by themselves reverse this trend, their effective utilization could provide a more enlightened Congress and military establishment, and a more efficient defense industry. The money saved on defense could be applied to strengthening the nation's industrial base.

LIST OF REFERENCES

- A. Executive Office of the President, Office of Management and Budget, Fiscal Year 1972, The U. S. Budget in Brief, 29 January, 1971.
- B. Armed Services Procurement Regulations (ASPR), Chapter 137 of Title 10, United States Code.
- C. Naval Material Command, Defense Procurement Management for Technical Personnel, Harbridge House, Inc., Boston, Massachusetts, 1972.
- D. Naval Material Command, Survey of Statistics, Washington, D. C., June 1971.
- E. ___, "F-14 Costs, Missions," Aviation Week & Space Technology, 10 January 1970.
- F. U. S. Army Material Command, ALM-32-3294-LC, Should Cost, 1971.
- G. Robert Seiwert, First Lieutenant, U. S. Army, "Budget Squeeze Necessitates Stretching the DoD Dollar", The Government Executive, April 1971.
- H. Headquarters, U. S. Army Material Command, AMCP-715-7, Should Cost Analysis Guide, May 1972
- I. Gordon W. Rule, Concepts of Should Cost, a paper presented at the National Security Industrial Association Procurement Advisory Committee, Homestead, Pennsylvania, 26 May 1972.
- J. J. H. Stolarow, The Should Cost Method of Pricing Government Contracts, a paper presented at the San Francisco Chapter of the National Contract Management Association, San Francisco, California, 31 July 1971.
- K. E. B. Cleman, Commander, USN, A Should Cost Study - The Case of the MK-48 Torpedo, a paper presented to the Kearny Seminar, Chicago, Illinois, 26 February 1972.
- L. Rowland G. Freeman III, Rear Admiral, USN, Should Cost, a paper presented to the American Institute of Industrial Engineers, Washington, D. C., 23 April 1971.
- M. Headquarters, U. S. Air Force, Procurement - Should Cost, August, 1972.
- N. H. E. Maynard, Handbook of Modern Manufacturing Management, McGraw-Hill Book Company, New York, New York, 1967.

- O. W. P. Gwinn, Remarks on Should Cost, a talk given before the Industry Advisory Council, Washington, D. C., 13 February 1971.
- P. E. B. Coleman, Commander, USN, A talk given before the American Institute of Industrial Engineers Seminar, Washington, D. C., 24 March 1972.
- Q. The General Accounting Office, Application of "Should Cost" Concepts in Reviews of Contractor's Operations, B-159869, 26 February 1971.
- R. ___, "Army Pleased With Results of 'Should Cost' Studies, May Expand Use to GOCO Facilities," Federal Contracts Report, No. 363, 8 February 1971.
- S. Henry A. Miley, General, U. S. Army, The Should Cost Concept and Its Application by the Army, a talk given before the joint meeting of the Federal Government's Accountants Association and the National Contract Management Association, Washington, D. C., September 1971.
- T. Gerald Marks, "Utilizing Engineering Principles in Auditing, The GAO Review, Spring, 1972
- U. Gordon A. Frank, VE and the Should Cost Concept, a paper presented by the Department of Defense Product Engineering Office, Washington, D. C., June 1972.
- V. A. T. Kearney & Company, Torpedo MK-48 Production Cost Study, Executive Summary, Chicago, Illinois, 1 June 1971.
- W. ___, "The Should Cost Concept," Federal Contracts Report, No. 449, 2 October 1972.
- X. Joseph P. Harris, Congressional Control of Administration, The Brookings Institute, Washington, D. C., 1964.
- Y. The General Accounting Office, Standards for Audit of Governmental Organizations, Programs, Activities, & Functions, Washington, D. C., 1972.
- Z. The Commission of Government Procurement, Summary of the Reports of the Commission on Government Procurement, Washington, D. C., December 1972.
- AA. Jack Rayburn, Power at the Pentagon, Harper & Row, Publishers, New York, New York, 1964.

ACKNOWLEDGEMENTS

The author wishes to express his appreciation for the assistance provided him by the following people;

BROWN, THOMAS	----Deputy Chief of Procurement, Air Force Logistics Command Wright-Patterson AFB
COLEMAN, ROBERT CDR., USN	----MARK 48 Weapons Systems Project
CROCKET, THOMAS MAJ., USAF	----U. S. Army Logistics Management Command Fort Lee, Virginia
FOWLER, JAMES	----Office of the Supervisor of Industrial Engineering, General Accounting Office
KALAFUT, GEORGE CDR., USN	----Naval Air Systems Command
KORADE, RUDY	----MARK 48 Weapons Systems Project
MARKS, GERALD	----Director, Office of the Supervisor of Industrial Engineering, General Accounting Office
MARSHALL, W. B. LCDR., USN	----Naval Material Command
MAXIM, BRUCE LCDR., USN	----MARK 48 Weapons System Project
McCUBBINS, EUGENE	----Naval Material Command
POLLACK, CHARLES CAPT., USN	----MARK 48 Weapons System Project
RANKOVICK, ARTHUR	----U. S. Air Force Systems Command, Andrews AFB
SCHAEFFER, WILLIAM LT. COL., USAF	----AF/LGPLB, Headquarters, U. S. Air Force
SMITH, JOHN	----Naval Ordnance Systems Command
STRAYER, DANIAL MAJ., USAF	----U. S. Air Force Logistics Command, Wright-Patterson AFB

SWARS, WILLAIM

----Director of Procurement/Production
McClellan, AFB

WASHBURN, WILLAIM
CDR., USN

----Naval Material Command